



REPORT No.: SZ25020263W03

# TEST REPORT

**APPLICANT** : Linkplay Technology Inc.

**PRODUCT NAME** : WiiM Amp Ultra

**MODEL NAME** : AMP003

**BRAND NAME** : WiiM

**FCC ID** : 2BABF-AMP003

**STANDARD(S)** : 47 CFR Part 15 Subpart C

**RECEIPT DATE** : 2025-03-19

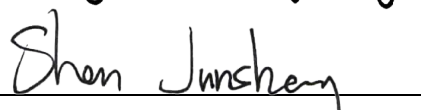
**TEST DATE** : 2025-04-15 to 2025-05-09

**ISSUE DATE** : 2025-05-19

Edited by:

  
Zeng Xiaoying (Rapporteur)

Approved by:

  
Shen Junsheng (Supervisor)

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**MORLAB**

Shenzhen Morlab Communications Technology Co., Ltd.  
FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

Tel: 86-755-36698555

Http://www.morlab.cn

Fax: 86-755-36698525

E-mail: service@morlab.cn





# DIRECTORY

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| Change History |            |                   |
|----------------|------------|-------------------|
| Version        | Date       | Reason for change |
| 1.0            | 2025-05-19 | First edition     |
|                |            |                   |



# 1. Summary of Test Result

| No. | Section           | Description                               | Test Date     | Test Engineer | Result               | Method Determination /Remark |
|-----|-------------------|-------------------------------------------|---------------|---------------|----------------------|------------------------------|
| 1   | 15.203            | Antenna Requirement                       | N/A           | N/A           | N/A <sub>Note1</sub> | N/A                          |
| 2   | N/A               | Duty Cycle of Test Signal                 | N/A           | N/A           | N/A <sub>Note1</sub> | N/A                          |
| 3   | 15.247(b)         | Maximum Peak Conducted Output Power       | N/A           | N/A           | N/A <sub>Note1</sub> | N/A                          |
| 4   | 15.247(b)         | Maximum Average Conducted Output Power    | N/A           | N/A           | N/A <sub>Note1</sub> | N/A                          |
| 5   | 15.247(a)         | Bandwidth                                 | N/A           | N/A           | N/A <sub>Note1</sub> | N/A                          |
| 6   | 15.247(d)         | Conducted Spurious Emission and Band Edge | N/A           | N/A           | N/A <sub>Note1</sub> | N/A                          |
| 7   | 15.247(e)         | Power Spectral Density                    | N/A           | N/A           | N/A <sub>Note1</sub> | N/A                          |
| 8   | 15.207            | Conducted Emission                        | May 09, 2025  | Fan Shengquan | PASS                 | No deviation                 |
| 9   | 15.247(d)         | Restricted Frequency Bands                | Apr. 09, 2025 | Gao Jianrou   | PASS                 | No deviation                 |
| 10  | 15.209, 15.247(d) | Radiated Emission                         | Apr. 22, 2025 | Gao Jianrou   | PASS                 | No deviation                 |

**Note 1:** The test results of all conducted test items please refer to the module FCC test report (Report No.: SZ24040154W03), which issued on Jul. 26, 2024.

**Note 2:** The tests were performed according to the method of measurements prescribed in ANSI C63.10-2013 and KDB 558074 D01 v05r02.

**Note 3:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

**Note 4:** When the test result is a critical value, we will use the measurement uncertainty give the



judgment result based on the 95% confidence intervals.

## 1.1. Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C Radio Frequency Devices



## 1.2. Test Equipment List

### 1.2.1 Conducted Emission Test Equipment

| Equipment                       | Serial No.            | Type           | Manufacturer | Cal. Date  | Due Date   |
|---------------------------------|-----------------------|----------------|--------------|------------|------------|
| Receiver                        | MY56400093            | N9038A         | KEYSIGHT     | 2025.01.06 | 2026.01.05 |
| LISN                            | 8127449               | NSLK<br>8127   | Schwarzbeck  | 2025.01.09 | 2026.01.08 |
| Pulse Limiter<br>(10dB)         | VTSD 9561<br>F-B #206 | VTSD<br>9561-F | Schwarzbeck  | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable<br>(DC-100MHz) | BNC                   | MRE04          | Qualwave     | 2024.07.02 | 2025.07.01 |

### 1.2.2 List of Software Used

| Description    | Manufacturer | Software Version |
|----------------|--------------|------------------|
| JS32-RE        | Tonscend     | 5.0.0            |
| TS+ -[JS32-CE] | Tonscend     | 2.5.0.0          |

**1.2.3 Radiated Test Equipment**

| Equipment                   | Serial No.    | Type                  | Manufacturer | Cal. Date  | Due Date   |
|-----------------------------|---------------|-----------------------|--------------|------------|------------|
| Signal Analyzer             | MY56060145    | N9020A                | Agilent      | 2024.05.30 | 2025.05.29 |
| Test Antenna - Bi-Log       | 9163-519      | VULB 9163             | Schwarzbeck  | 2024.06.22 | 2025.06.21 |
| Test Antenna - Loop         | 1519-022      | FMZB1519              | Schwarzbeck  | 2024.06.03 | 2025.06.02 |
| Test Antenna – Horn         | 01774         | BBHA 9120D            | Schwarzbeck  | 2024.06.22 | 2025.06.21 |
| Test Antenna – Horn         | BBHA9170 #773 | BBHA9170              | Schwarzbeck  | 2024.06.22 | 2025.06.21 |
| Preamplifier (10MHz-6GHz)   | 46732         | S10M100L38 02         | LUCIX CORP.  | 2024.05.30 | 2025.05.29 |
| Preamplifier (2GHz-18GHz)   | 61171/61172   | S020180L32 03         | LUCIX CORP.  | 2024.05.30 | 2025.05.29 |
| Preamplifier (18GHz-40GHz)  | DS77209       | DCLNA0118-40C-S       | Decentest    | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable (DC-18GHz) | MRE001        | PE330                 | Pasternack   | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable (DC-18GHz) | MRE002        | CLU18                 | Pasternack   | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable (DC-18GHz) | MRE003        | CLU18                 | Pasternack   | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable (DC-40GHz) | 22290045      | QA360-40-KK-0.5       | Qualwave     | 2024.07.03 | 2025.07.02 |
| RF Coaxial Cable (DC-40GHz) | 22290046      | QA360-40-KKF-2        | Qualwave     | 2024.07.03 | 2025.07.02 |
| RF Coaxial Cable (DC-18GHz) | 22120181      | QA500-18-NN-5         | Qualwave     | 2024.07.03 | 2025.07.02 |
| Notch Filter                | N/A           | WRCG-2400-2483.5-60SS | Wainwright   | N/A        | N/A        |
| Anechoic Chamber            | N/A           | 9m*6m*6m              | CRT          | 2025.04.19 | 2028.04.18 |
| Anechoic Chamber            | N/A           | 9m*6m*6m              | CRT          | 2022.11.30 | 2025.11.29 |



### 1.3. Measurement Uncertainty

| Test Items                 | Uncertainty | Remark                   |
|----------------------------|-------------|--------------------------|
| Restricted Frequency Bands | ±5%         | Confidence levels of 95% |
| Radiated Emission          | ±2.95dB     | Confidence levels of 95% |
| Conducted Emission         | ±2.44dB     | Confidence levels of 95% |

### 1.4. Testing Laboratory

|                                      |                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Laboratory Name                      | Shenzhen Morlab Communications Technology Co., Ltd.                                                                              |
| Laboratory Address                   | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |
| Telephone                            | +86 755 36698555                                                                                                                 |
| Facsimile                            | +86 755 36698525                                                                                                                 |
| FCC Designation Number               | CN1192                                                                                                                           |
| FCC Test Firm<br>Registration Number | 226174                                                                                                                           |



## 2. General Description

### 2.1. Information of Applicant and Manufacturer

|                             |                                                 |
|-----------------------------|-------------------------------------------------|
| <b>Applicant</b>            | Linkplay Technology Inc.                        |
| <b>Applicant Address</b>    | 8000 Jarvis Avenue Suite #130, Newark, CA 94560 |
| <b>Manufacturer</b>         | Linkplay Technology Inc.                        |
| <b>Manufacturer Address</b> | 8000 Jarvis Avenue Suite #130, Newark, CA 94560 |

### 2.2. Information of EUT

|                                   |                                                    |
|-----------------------------------|----------------------------------------------------|
| <b>Product Name:</b>              | WiiM Amp Ultra                                     |
| <b>Sample No.:</b>                | 4#, 25#                                            |
| <b>Hardware Version:</b>          | A98D V02+Main Board V02                            |
| <b>Software Version:</b>          | Linkplay.5.2.708867                                |
| <b>Modulation Technology:</b>     | DSSS, OFDM, OFDMA                                  |
| <b>Modulation Type:</b>           | Refer to section2.3                                |
| <b>Wireless Technology:</b>       | 802.11b, 802.11g, 802.11n (HT20), 802.11ax (HEW20) |
| <b>Operating Frequency Range:</b> | 2412MHz–2462MHz                                    |
| <b>Antenna Type:</b>              | PIFA Antenna                                       |
| <b>Antenna Gain:</b>              | ANT1: 3.46dBi; ANT2: 3.46dBi                       |

**Note 1:** The test results of all conducted test items please refer to the module FCC test report (Report No.: SZ24040154W03), which issued on Jul. 26, 2024. We only recorded the radiated test result in this report.

**Note 2:** The EUT has two antennas and it operates in single antenna. Both of the two antennas were evaluated separately, only the worst test result (ANT1) were recorded in the test report.

**Note 3:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.





## 2.3.Channel List of EUT

| Nominal Channel Bandwidth | Channel  | Frequency (MHz) | Channel   | Frequency (MHz) |
|---------------------------|----------|-----------------|-----------|-----------------|
| 20MHz                     | <b>1</b> | <b>2412</b>     | 8         | 2447            |
|                           | 2        | 2417            | 9         | 2452            |
|                           | 3        | 2422            | 10        | 2457            |
|                           | 4        | 2427            | <b>11</b> | <b>2462</b>     |
|                           | 5        | 2432            |           |                 |
|                           | <b>6</b> | <b>2437</b>     |           |                 |
|                           | 7        | 2442            |           |                 |

**Note 1:** The black bold channels were selected for test.

## 2.4. Test Configuration of EUT

### 2.4.1. Modulation Type and Data Rate of EUT

| Mode     | Bandwidth (MHz) | Modulation Technology | Modulation Type | Data Rate                  | RU Size   |
|----------|-----------------|-----------------------|-----------------|----------------------------|-----------|
| 802.11b  | 20              | DSSS                  | <b>DBPSK</b>    | 1/2/5.5/11Mbps             | N/A       |
|          |                 |                       | DQPSK           |                            |           |
|          |                 |                       | CCK             |                            |           |
| 802.11g  | 20              | OFDM                  | <b>BPSK</b>     | 6/9/12/18/24/36/48/54 Mbps | N/A       |
|          |                 |                       | QPSK            |                            |           |
|          |                 |                       | 16QAM           |                            |           |
|          |                 |                       | 64QAM           |                            |           |
| 802.11n  | 20 (HT20/40)    | OFDM                  | <b>BPSK</b>     | <b>MCS0~MCS7</b>           | N/A       |
|          |                 |                       | QPSK            |                            |           |
|          |                 |                       | 16QAM           |                            |           |
|          |                 |                       | 64QAM           |                            |           |
| 802.11ax | 20 (HEW20)      | OFDM/ OFDMA           | <b>BPSK</b>     | <b>MSC0~MCS11</b>          | 26/52/106 |
|          |                 |                       | QPSK            |                            |           |
|          |                 |                       | 16QAM           |                            |           |
|          |                 |                       | 64QAM           |                            |           |
|          |                 |                       | 256QAM          |                            |           |
|          |                 |                       | 1024QAM         |                            |           |

**Note1:** The worst-case mode (bold face) in all data rates has been determined during the pre-scan, only the test data of the worst-case were recorded in this report.

**Note2:** The RF signal transmission of EUT is controlled by the build-in engineering mode which is provided by the manufacturer. The recorded power setting value is the maximum that the engineering mode has configuration during testing.

### 2.4.2.802.11ax RU Allocation

| BW<br>(MHz) | RU Size        |         |          | User | RU Offset          |
|-------------|----------------|---------|----------|------|--------------------|
|             | Full<br>(Tone) | Partial |          |      |                    |
|             |                | (Tone)  | BW (MHz) |      |                    |
| 20          | 242            | 26      | 2        | 9    | @0/1/2/3/4/5/6/7/8 |
|             |                | 52      | 4        | 4    | @37/38/39/40       |
|             |                | 106     | 8        | 2    | @53/54             |



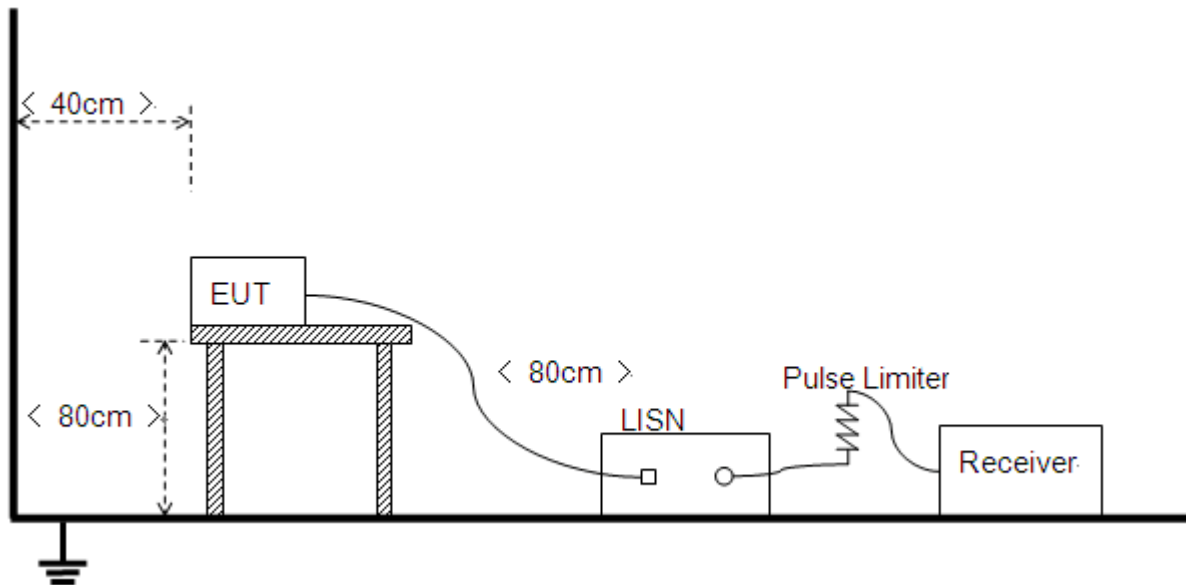
REPORT No.: SZ25020263W03

## 2.5. Test Conditions

|                            |        |
|----------------------------|--------|
| Temperature (°C)           | 15–35  |
| Relative Humidity (%)      | 30–60  |
| Atmospheric Pressure (kPa) | 86–106 |

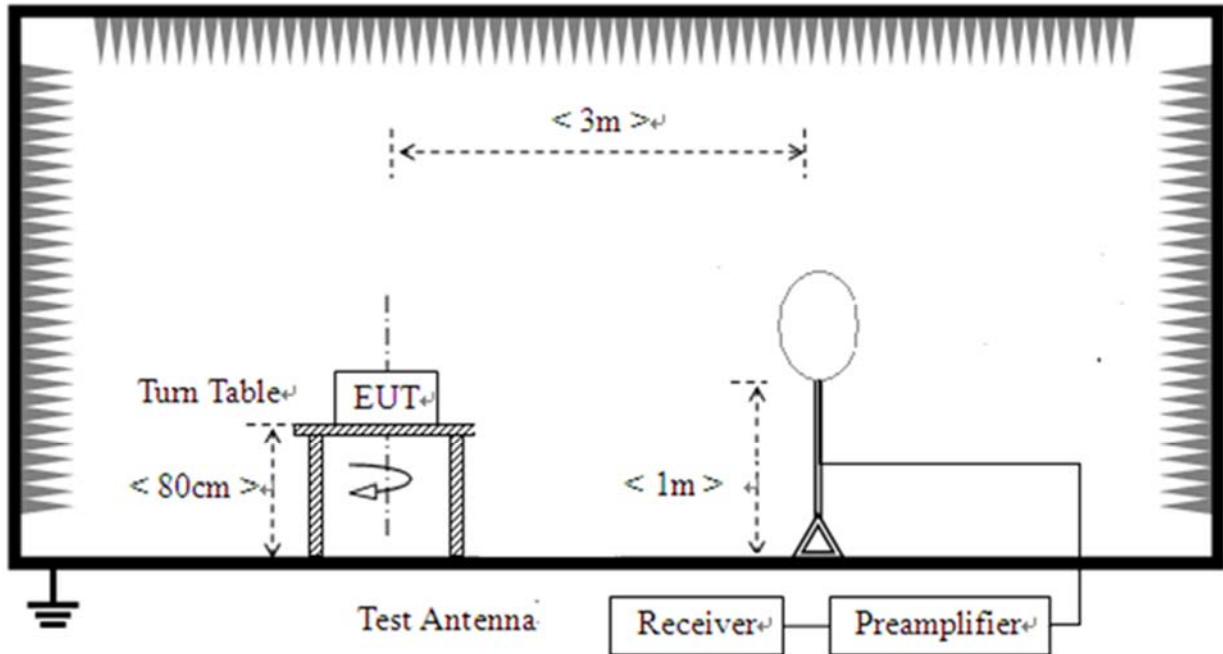
## 2.6. Test Setup Layout Diagram

### 2.6.1. Conducted Emission Measurement

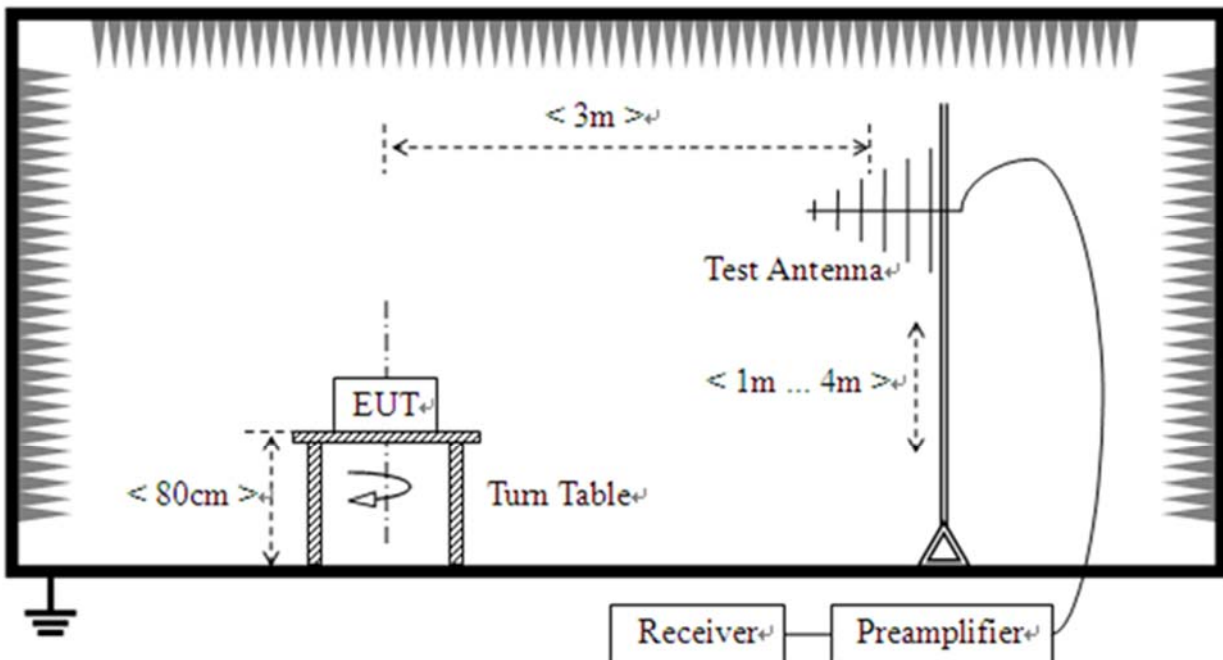


## 2.6.2.Radiation Measurement

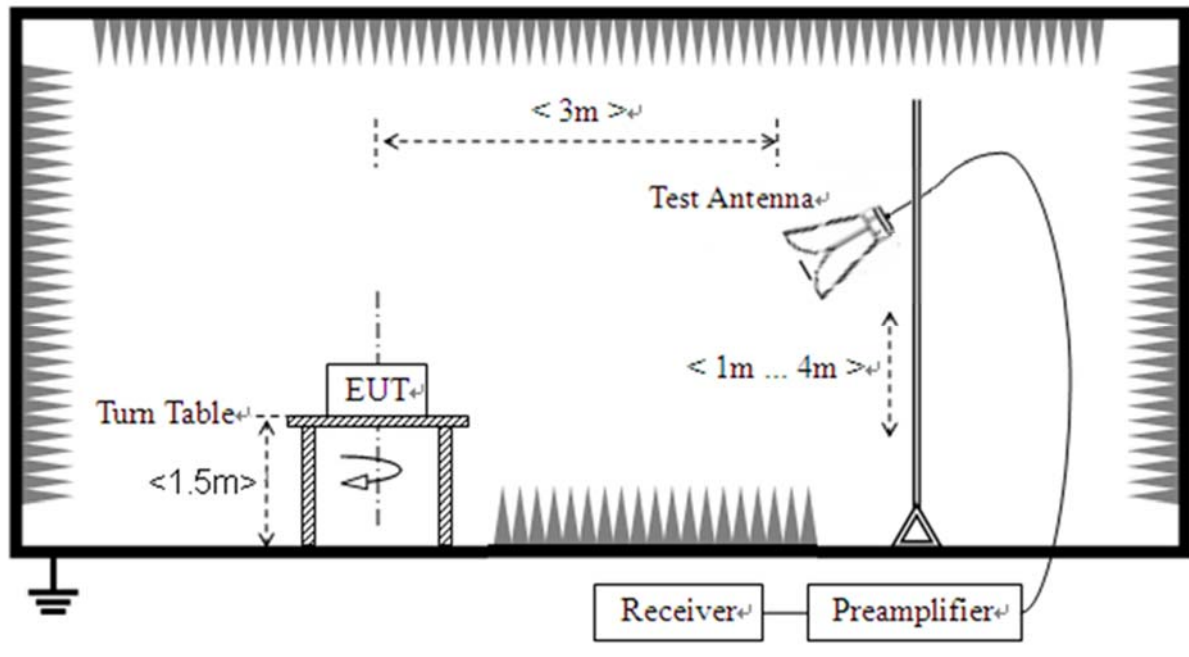
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



## 3. Test Results

### 3.1. Conducted Emission

#### 3.1.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

| Frequency Range (MHz) | Conducted Limit (dB $\mu$ V) |          |
|-----------------------|------------------------------|----------|
|                       | Quai-peak                    | Average  |
| 0.15 - 0.50           | 66 to 56                     | 56 to 46 |
| 0.50 - 5              | 56                           | 46       |
| 5 - 30                | 60                           | 50       |

Note:

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

#### 3.1.2. Test Procedures

The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

#### 3.1.3. Test Setup Layout

Refer to chapter 2.6.2 in this report.

#### 3.1.4. Test Result

Refer to Annex A.1 in this report.

## 3.2. Restricted Frequency Bands

### 3.2.1. Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

### 3.2.2. Test Procedures

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$

VBW = 3 MHz

Sweep = auto

Detector function = peak/average

Trace = max hold

Allow the trace to stabilize

### 3.2.3. Test Setup Layout

Refer to chapter 2.6.3 in this report.

### 3.2.4. Test Result

Refer to Annex A.2 in this report.





### 3.3. Radiated Emission

#### 3.3.1. Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength ( $\mu\text{V/m}$ ) | Measurement Distance (m) |
|-----------------|------------------------------------|--------------------------|
| 0.009 - 0.490   | 2400/F(kHz)                        | 300                      |
| 0.490 - 1.705   | 24000/F(kHz)                       | 30                       |
| 1.705 - 30.0    | 30                                 | 30                       |
| 30 - 88         | 100                                | 3                        |
| 88 - 216        | 150                                | 3                        |
| 216 - 960       | 200                                | 3                        |
| Above 960       | 500                                | 3                        |

**Note1:** For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

**Note2:** For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK). In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table).



### **3.3.2.Test Procedures**

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions. For measurements above 1 GHz, keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

### **3.3.3.Test Setup Layout**

Refer to chapter 2.6.3 in this report.

### **3.3.4.Test Result**

Refer to Annex A.3 in this report.



## Annex A Test Data and Result

### A.1. Conducted Emission

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Set RBW=9kHz, VBW=30kHz. Refer to recorded points and plots below.

**Note:** Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

#### A. Test Setup:

Test Mode: EUT+TV+HDMI cable+Load+Fiber box+Mobile phone+Audio+U disk+WIFI TX

Test voltage: AC 120V/60Hz

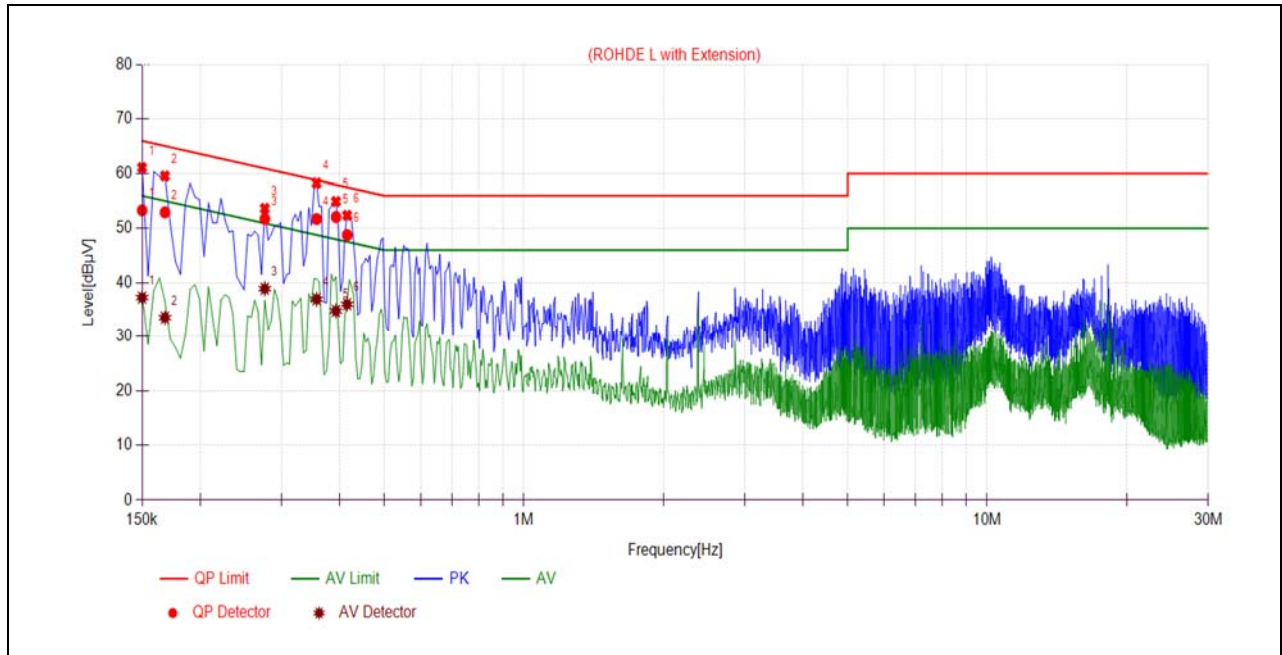
The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V}] = U_R + L_{\text{Cable loss}} [\text{dB}] + A_{\text{Factor}}$$

$U_R$ : Receiver Reading

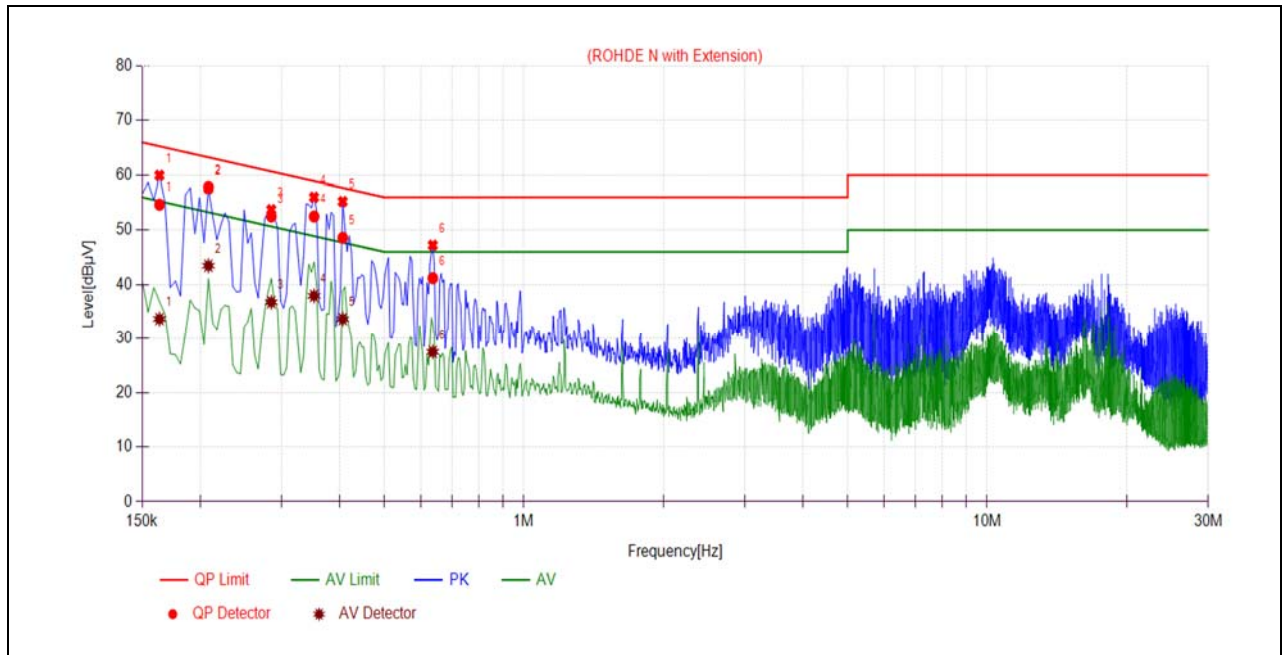
$A_{\text{Factor}}$ : Voltage division factor of LISN

## B. Test Plot:



(L Phase)

| No. | Fre.<br>(MHz) | Emission Level (dBμV) |         | Limit (dBμV) |         | Power-line | Verdict |
|-----|---------------|-----------------------|---------|--------------|---------|------------|---------|
|     |               | Quai-peak             | Average | Quai-peak    | Average |            |         |
| 1   | 0.1500        | 53.33                 | 37.26   | 66.00        | 56.00   | Line       | PASS    |
| 2   | 0.1680        | 52.97                 | 33.56   | 65.06        | 55.06   |            | PASS    |
| 3   | 0.2760        | 51.76                 | 38.90   | 60.93        | 50.93   |            | PASS    |
| 4   | 0.3570        | 51.74                 | 36.96   | 58.80        | 48.80   |            | PASS    |
| 5   | 0.3930        | 52.11                 | 34.81   | 58.00        | 48.00   |            | PASS    |
| 6   | 0.4155        | 48.78                 | 36.04   | 57.54        | 47.54   |            | PASS    |



(N Phase)

| No. | Fre.<br>(MHz) | Emission Level (dBμV) |         | Limit (dBμV) |         | Power-line | Verdict |
|-----|---------------|-----------------------|---------|--------------|---------|------------|---------|
|     |               | Quai-peak             | Average | Quai-peak    | Average |            |         |
| 1   | 0.1635        | 54.66                 | 33.67   | 65.28        | 55.28   | Neutral    | PASS    |
| 2   | 0.2085        | 57.82                 | 43.47   | 63.26        | 53.26   |            | PASS    |
| 3   | 0.2850        | 52.51                 | 36.78   | 60.67        | 50.67   |            | PASS    |
| 4   | 0.3525        | 52.50                 | 37.94   | 58.90        | 48.90   |            | PASS    |
| 5   | 0.4065        | 48.61                 | 33.65   | 57.72        | 47.72   |            | PASS    |
| 6   | 0.6360        | 41.19                 | 27.49   | 56.00        | 46.00   |            | PASS    |

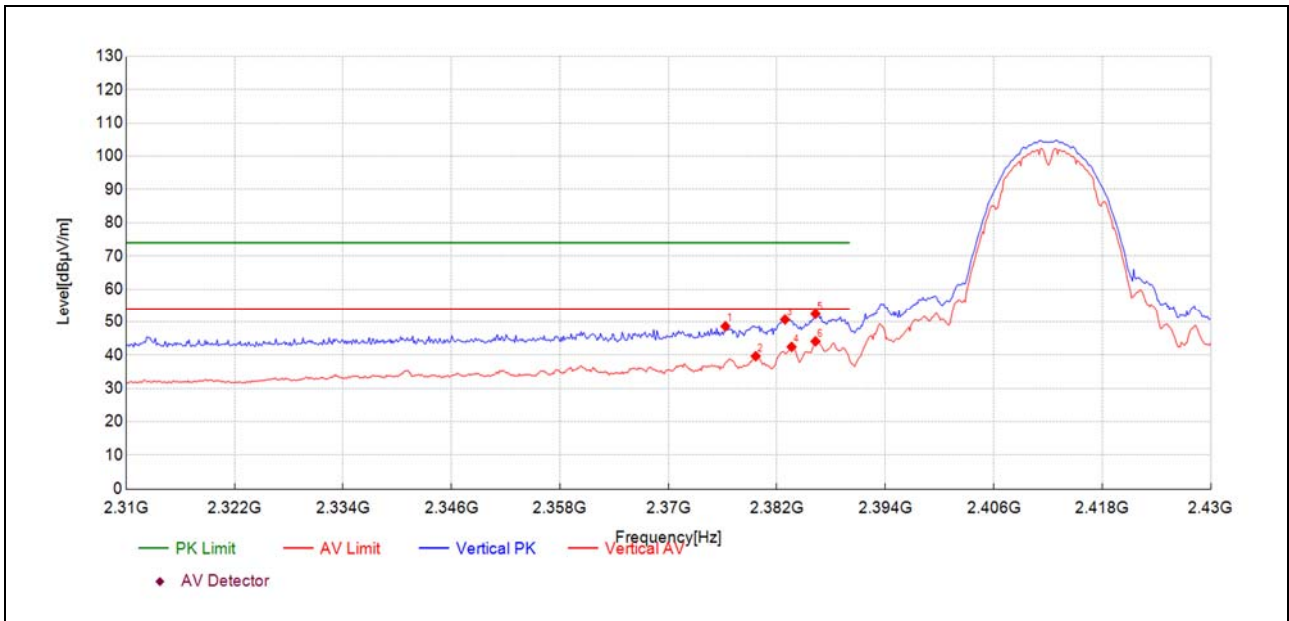
## A.2. Restricted Frequency Bands

**Note 1:** Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (Vertical) was recorded in this test report.

**Note 2** All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.

### 802.11b Mode

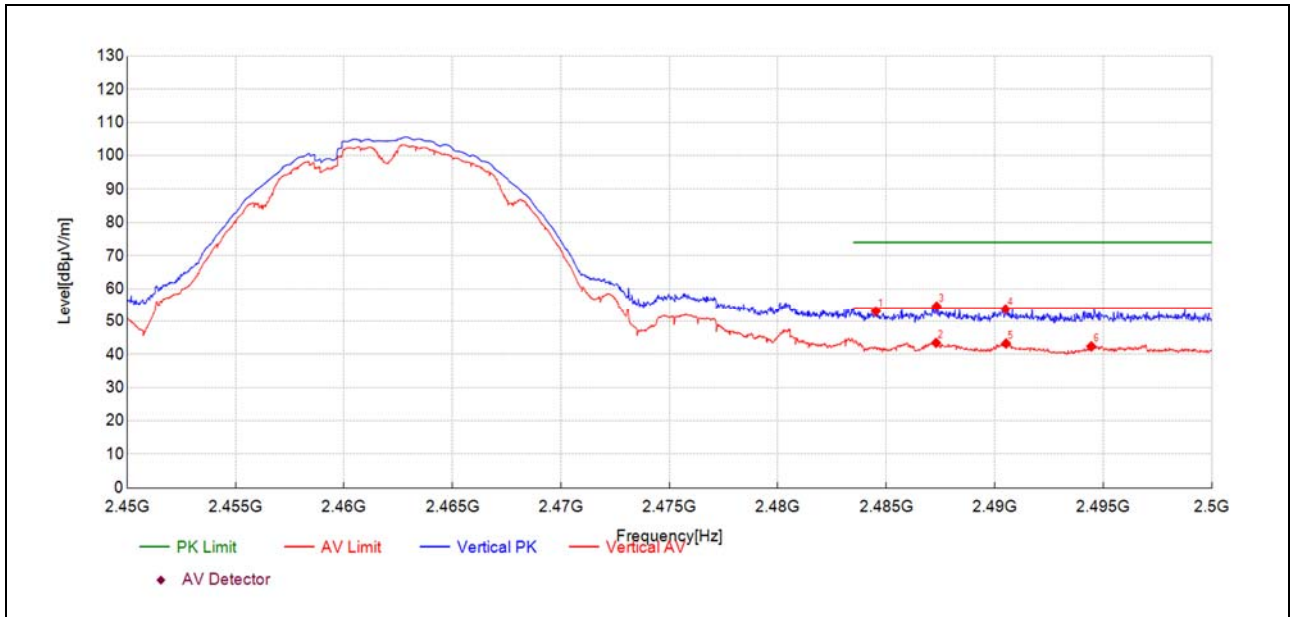
Plot for Channel 1



| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 2376.31       | 16.1              | 48.59             | 32.490           | 74.00             | 25.41          | 150            | 226          | PK       | PASS    |
| 2379.67       | 7.1               | 39.63             | 32.510           | 54.00             | 14.37          | 150            | 226          | AV       | PASS    |
| 2382.91       | 18.1              | 50.63             | 32.520           | 74.00             | 23.37          | 150            | 226          | PK       | PASS    |
| 2383.63       | 9.9               | 42.42             | 32.520           | 54.00             | 11.58          | 150            | 226          | AV       | PASS    |
| 2386.28       | 19.8              | 52.35             | 32.530           | 74.00             | 21.65          | 150            | 226          | PK       | PASS    |
| 2386.28       | 11.6              | 44.08             | 32.530           | 54.00             | 9.92           | 150            | 226          | AV       | PASS    |



Plot for Channel 11

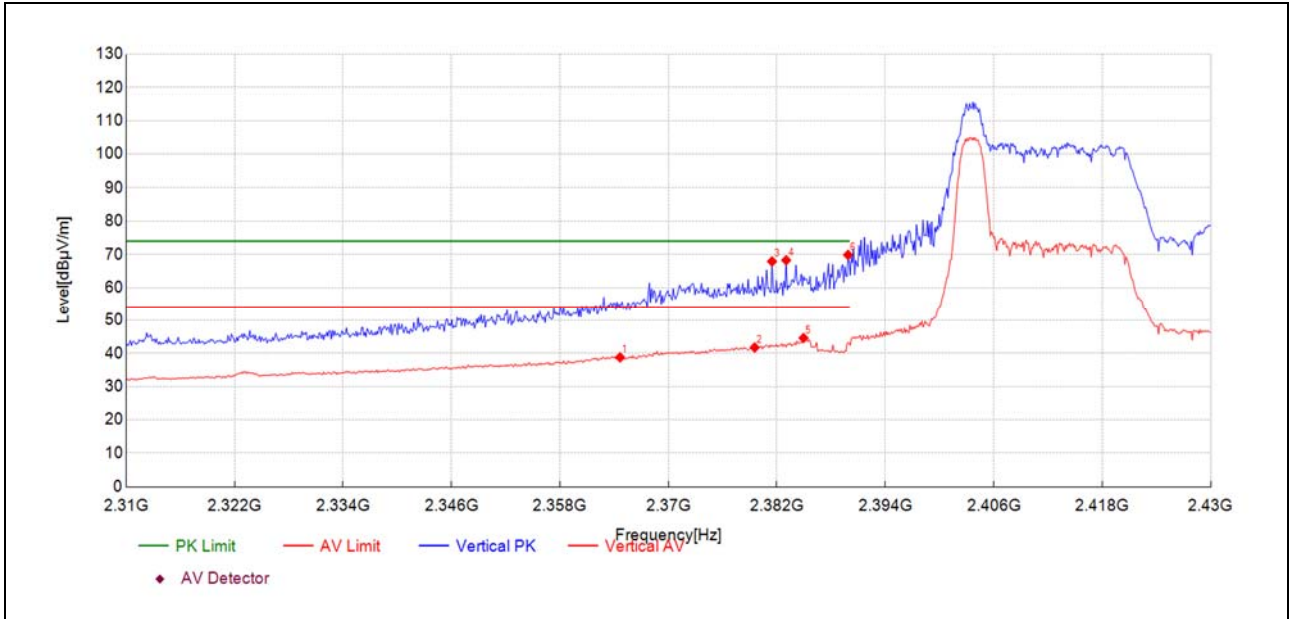


| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 2484.52       | 20.0              | 53.04             | 33.030           | 74.00             | 20.96          | 150            | 227          | PK       | PASS    |
| 2487.29       | 10.4              | 43.43             | 33.030           | 54.00             | 10.57          | 150            | 227          | AV       | PASS    |
| 2487.32       | 21.6              | 54.61             | 33.030           | 74.00             | 19.39          | 150            | 227          | PK       | PASS    |
| 2490.50       | 20.7              | 53.72             | 33.020           | 74.00             | 20.28          | 150            | 227          | PK       | PASS    |
| 2490.52       | 10.2              | 43.23             | 33.020           | 54.00             | 10.77          | 150            | 227          | AV       | PASS    |
| 2494.45       | 9.4               | 42.38             | 33.010           | 54.00             | 11.62          | 150            | 227          | AV       | PASS    |



# 802.11ax (HEW20) RU26 Mode

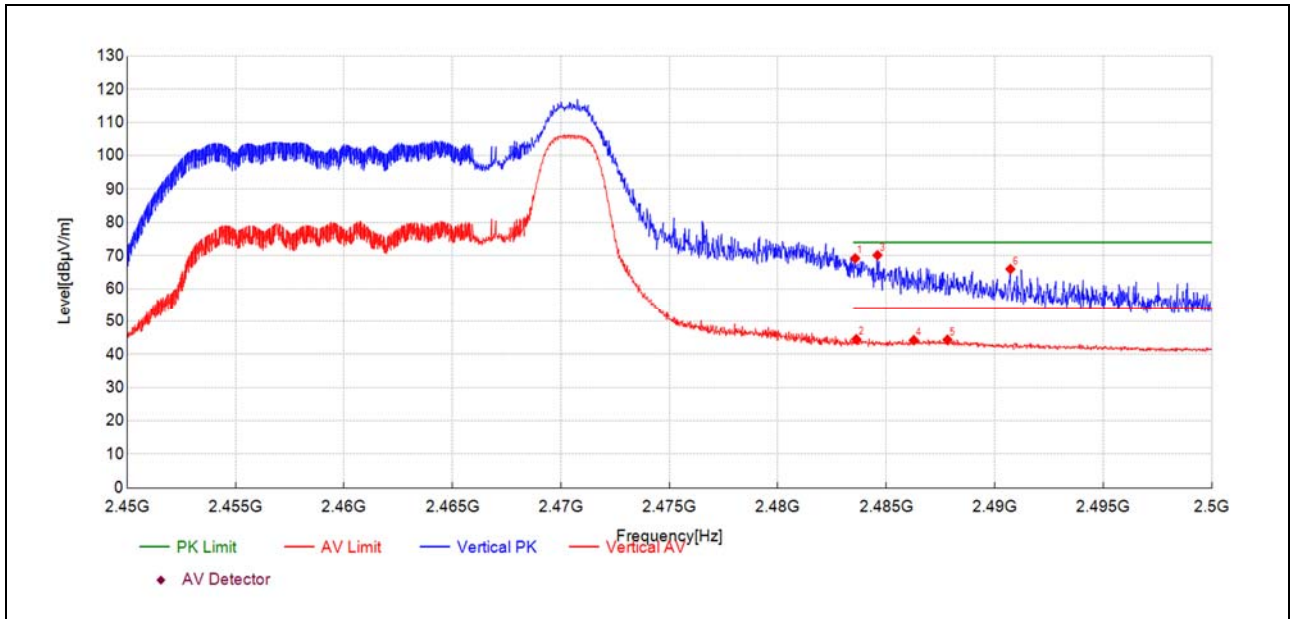
## Plot for Channel 1



| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 2364.65       | 6.3               | 38.76             | 32.450           | 54.00             | 15.24          | 150            | 225          | AV       | PASS    |
| 2379.55       | 9.2               | 41.71             | 32.510           | 54.00             | 12.29          | 150            | 225          | AV       | PASS    |
| 2381.47       | 35.4              | 67.89             | 32.510           | 74.00             | 6.11           | 150            | 293          | PK       | PASS    |
| 2383.03       | 35.7              | 68.26             | 32.520           | 74.00             | 5.74           | 150            | 274          | PK       | PASS    |
| 2384.95       | 12.0              | 44.56             | 32.530           | 54.00             | 9.44           | 150            | 225          | AV       | PASS    |
| 2389.88       | 37.3              | 69.87             | 32.540           | 74.00             | 4.13           | 150            | 233          | PK       | PASS    |



Plot for Channel 11



| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 2483.57       | 36.2              | 69.18             | 33.030           | 74.00             | 4.82           | 150            | 218          | PK       | PASS    |
| 2483.62       | 11.5              | 44.54             | 33.030           | 54.00             | 9.46           | 150            | 227          | AV       | PASS    |
| 2484.59       | 37.1              | 70.13             | 33.030           | 74.00             | 3.87           | 150            | 218          | PK       | PASS    |
| 2486.27       | 11.2              | 44.23             | 33.030           | 54.00             | 9.77           | 150            | 218          | AV       | PASS    |
| 2487.82       | 11.4              | 44.37             | 33.020           | 54.00             | 9.63           | 150            | 227          | AV       | PASS    |
| 2490.72       | 32.9              | 65.95             | 33.020           | 74.00             | 8.05           | 150            | 218          | PK       | PASS    |



### A.3. Radiated Emission

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

$A_T$ : Total correction Factor except Antenna

$U_R$ : Receiver Reading

$G_{\text{preamp}}$ : Preamplifier Gain

$A_{\text{Factor}}$ : Antenna Factor at 3m

During the test, the total correction Factor  $A_T$  and  $A_{\text{Factor}}$  were built in test software.

**Note1:** All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

**Note 2:** All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.

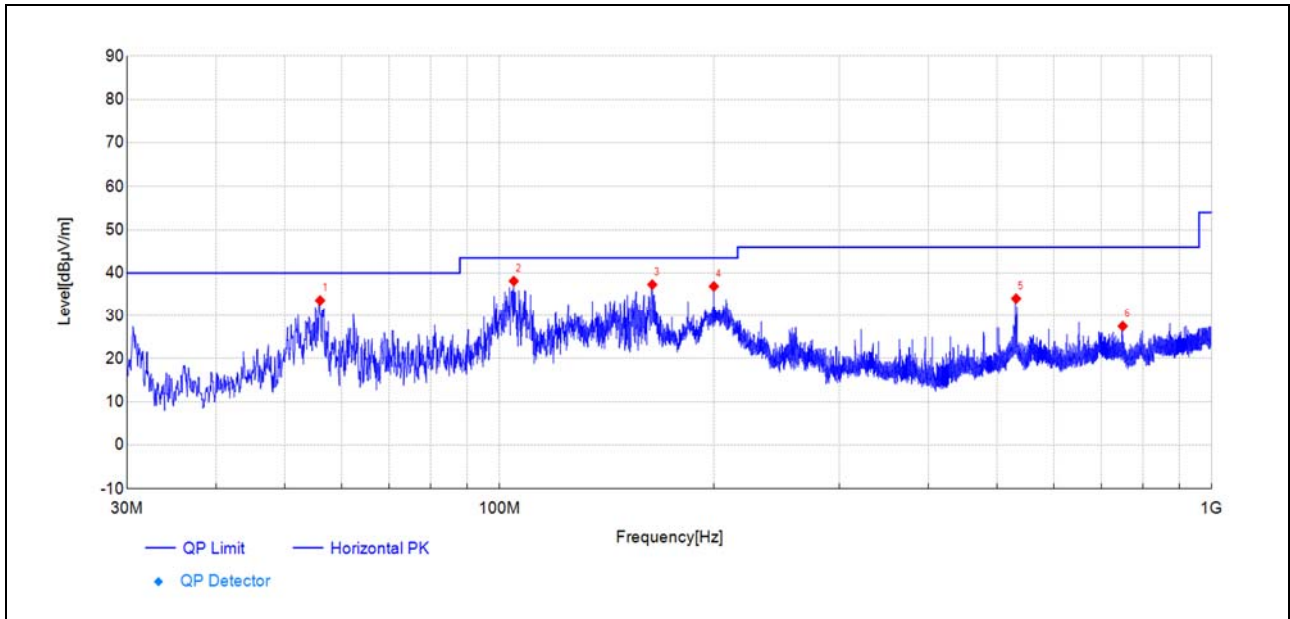
**Note 3:** For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

**Note 4:** For the frequency, which started from 18GHz to 10th harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.



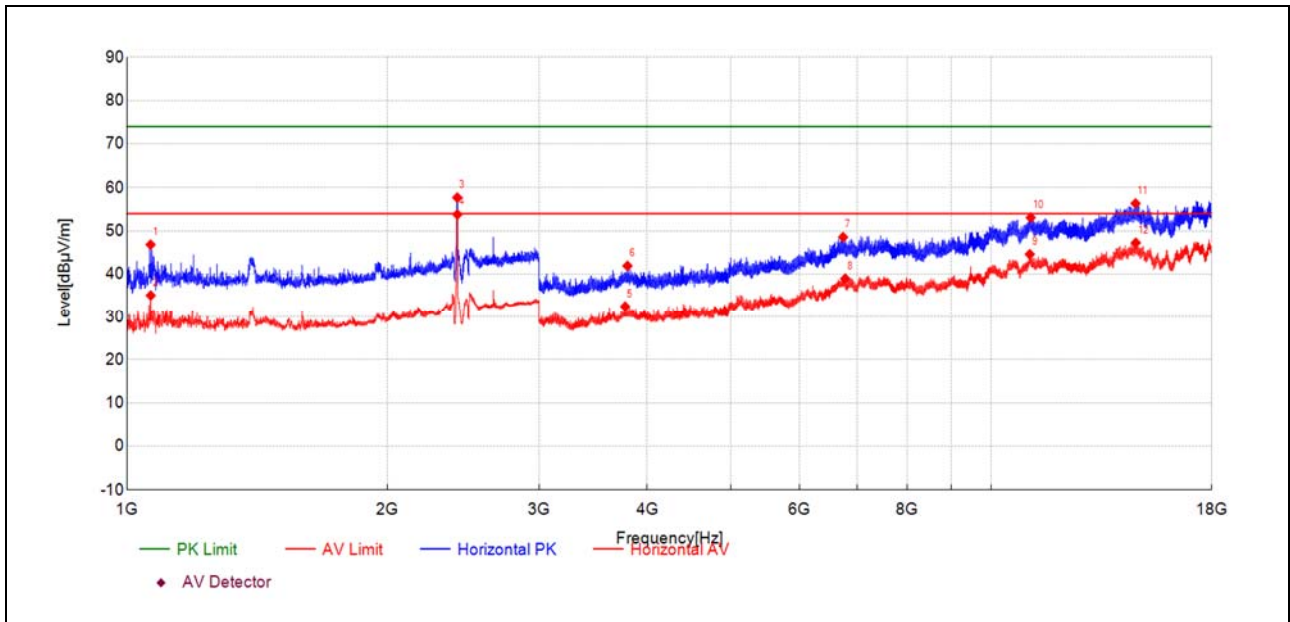
## 802.11b Mode

### Plot for Channel 1



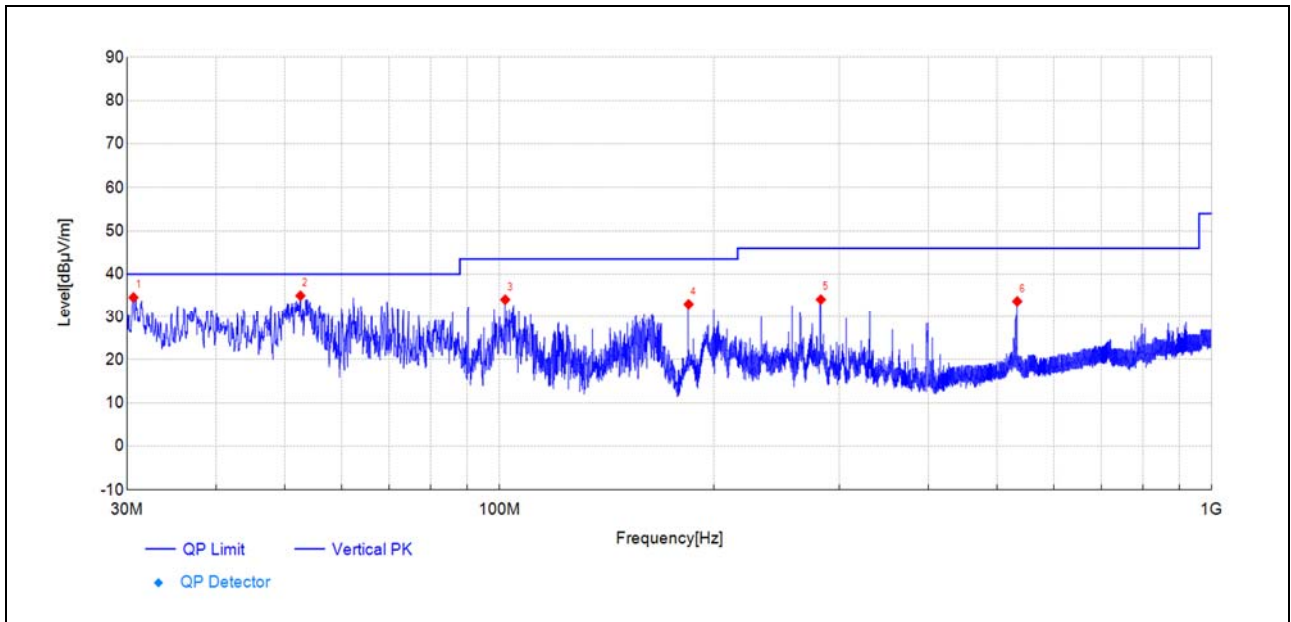
(Antenna Horizontal, 30MHz to 1GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 56.00         | 61.7              | 33.63             | -28.050          | 40.00             | 6.37           | 150            | 9            | PK       | PASS    |
| 104.74        | 67.4              | 38.13             | -29.300          | 43.50             | 5.37           | 150            | 340          | PK       | PASS    |
| 163.92        | 68.4              | 37.32             | -31.050          | 43.50             | 6.18           | 150            | 176          | PK       | PASS    |
| 200.00        | 65.7              | 36.91             | -28.780          | 43.50             | 6.59           | 150            | 78           | PK       | PASS    |
| 531.27        | 53.0              | 34.08             | -18.940          | 46.00             | 11.92          | 150            | 190          | PK       | PASS    |
| 750.02        | 42.4              | 27.51             | -14.840          | 46.00             | 18.49          | 150            | 206          | PK       | PASS    |



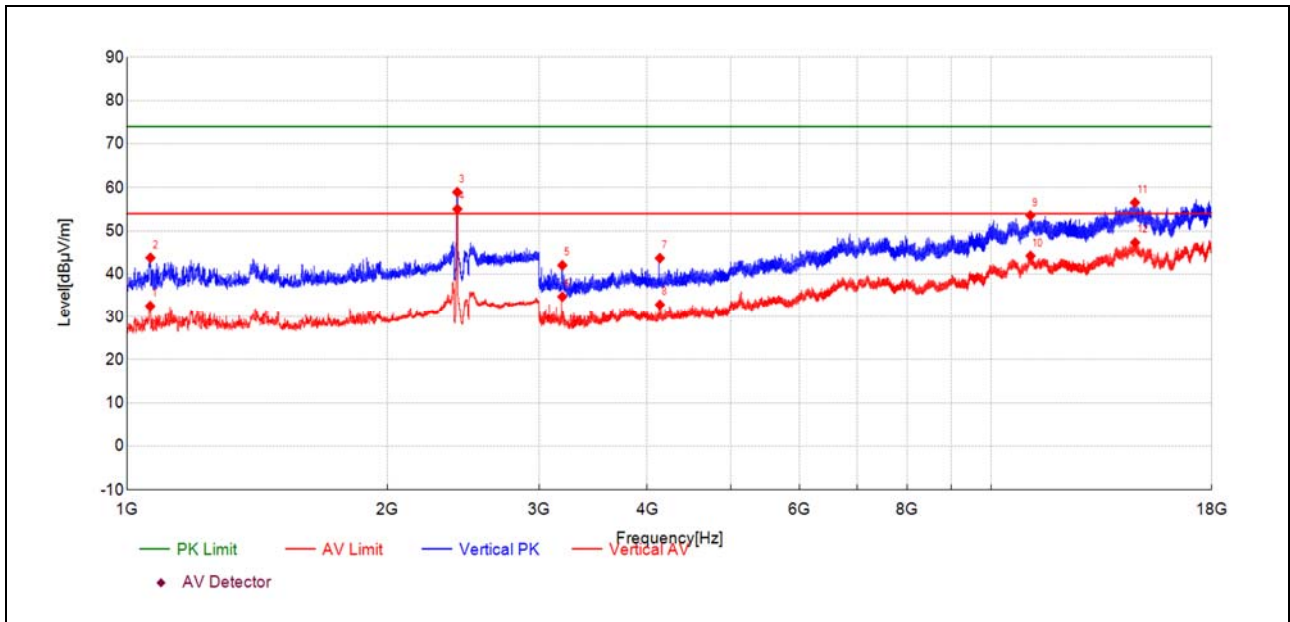
(Antenna Horizontal, 1GHz to 18GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 1064.81       | 49.4              | 46.82             | -2.620           | 74.00             | 27.18          | 150            | 49           | PK       | PASS    |
| 1065.21       | 37.7              | 35.05             | -2.620           | 54.00             | 18.95          | 150            | 49           | AV       | PASS    |
| 2410.68       | 52.3              | 57.72             | 5.380            | -                 | -              | 150            | 314          | PK       | NA      |
| 2411.48       | 48.4              | 53.80             | 5.390            | -                 | -              | 150            | 319          | AV       | NA      |
| 3771.02       | 40.8              | 32.46             | -8.350           | 54.00             | 21.54          | 150            | 186          | AV       | PASS    |
| 3794.59       | 50.1              | 41.90             | -8.180           | 74.00             | 32.10          | 150            | 12           | PK       | PASS    |
| 6740.25       | 44.5              | 48.56             | 4.100            | 74.00             | 25.44          | 150            | 186          | PK       | PASS    |
| 6779.25       | 35.1              | 38.95             | 3.890            | 54.00             | 15.05          | 150            | 311          | AV       | PASS    |
| 11086.52      | 30.7              | 44.59             | 13.900           | 54.00             | 9.41           | 150            | 25           | AV       | PASS    |
| 11113.95      | 39.1              | 53.08             | 14.000           | 74.00             | 20.92          | 150            | 40           | PK       | PASS    |
| 14693.48      | 35.8              | 56.35             | 20.590           | 74.00             | 17.65          | 150            | 271          | PK       | PASS    |
| 14705.05      | 26.7              | 47.26             | 20.550           | 54.00             | 6.74           | 150            | 79           | AV       | PASS    |



(Antenna Vertical, 30MHz to 1GHz)

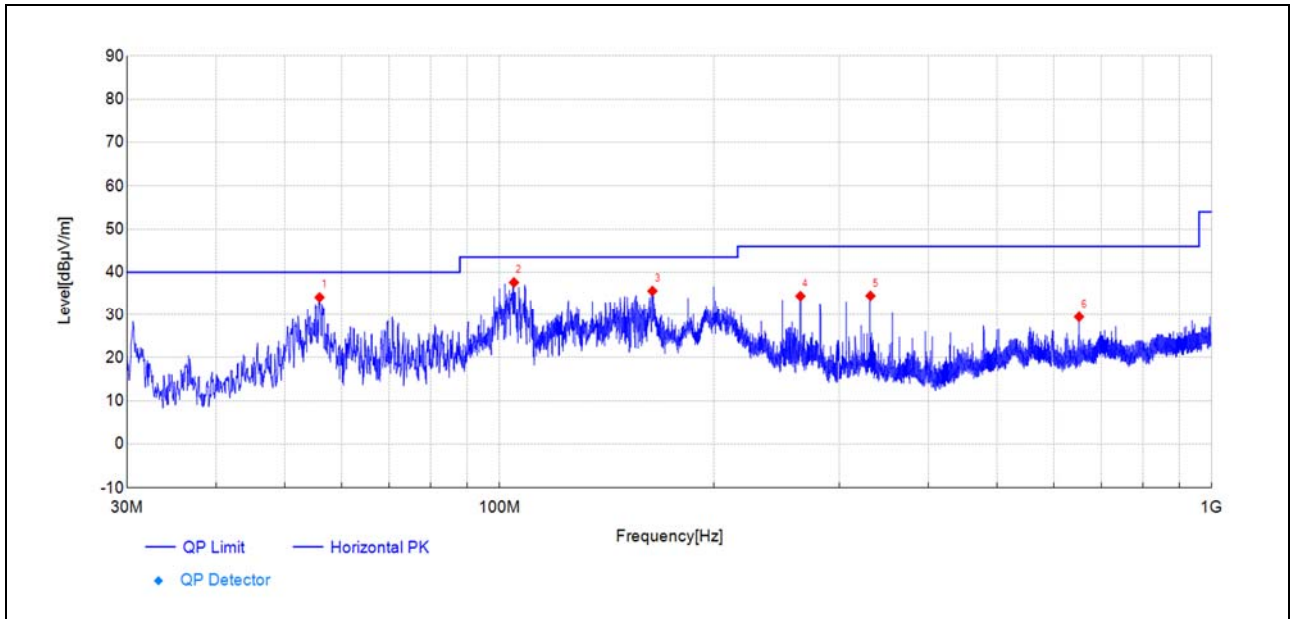
| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 30.63         | 65.4              | 34.60             | -30.750          | 40.00             | 5.40           | 150            | 317          | PK       | PASS    |
| 52.55         | 62.9              | 34.99             | -27.860          | 40.00             | 5.01           | 150            | 310          | PK       | PASS    |
| 101.88        | 63.7              | 34.08             | -29.600          | 43.50             | 9.42           | 150            | 131          | PK       | PASS    |
| 184.33        | 63.1              | 33.01             | -30.090          | 43.50             | 10.49          | 150            | 239          | PK       | PASS    |
| 282.65        | 60.4              | 34.11             | -26.310          | 46.00             | 11.89          | 150            | 273          | PK       | PASS    |
| 533.26        | 52.7              | 33.69             | -19.030          | 46.00             | 12.31          | 150            | 246          | PK       | PASS    |



(Antenna Vertical, 1GHz to 18GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 1063.61       | 35.2              | 32.57             | -2.640           | 54.00             | 21.43          | 150            | 88           | AV       | PASS    |
| 1064.41       | 46.4              | 43.80             | -2.620           | 74.00             | 30.20          | 150            | 66           | PK       | PASS    |
| 2410.68       | 53.6              | 58.96             | 5.380            | -                 | -              | 150            | 232          | PK       | NA      |
| 2411.48       | 49.7              | 55.05             | 5.390            | -                 | -              | 150            | 237          | AV       | NA      |
| 3189.86       | 52.8              | 42.05             | -10.760          | 74.00             | 31.95          | 150            | 150          | PK       | PASS    |
| 3189.86       | 45.5              | 34.76             | -10.760          | 54.00             | 19.24          | 150            | 150          | AV       | PASS    |
| 4136.18       | 51.8              | 43.70             | -8.060           | 74.00             | 30.30          | 150            | 110          | PK       | PASS    |
| 4137.03       | 40.9              | 32.89             | -8.050           | 54.00             | 21.11          | 150            | 110          | AV       | PASS    |
| 11102.80      | 39.5              | 53.58             | 14.070           | 74.00             | 20.42          | 150            | 3            | PK       | PASS    |
| 11106.23      | 30.2              | 44.23             | 14.040           | 54.00             | 9.77           | 150            | 69           | AV       | PASS    |
| 14672.90      | 36.0              | 56.57             | 20.530           | 74.00             | 17.43          | 150            | 95           | PK       | PASS    |
| 14676.33      | 26.8              | 47.31             | 20.540           | 54.00             | 6.69           | 150            | 202          | AV       | PASS    |

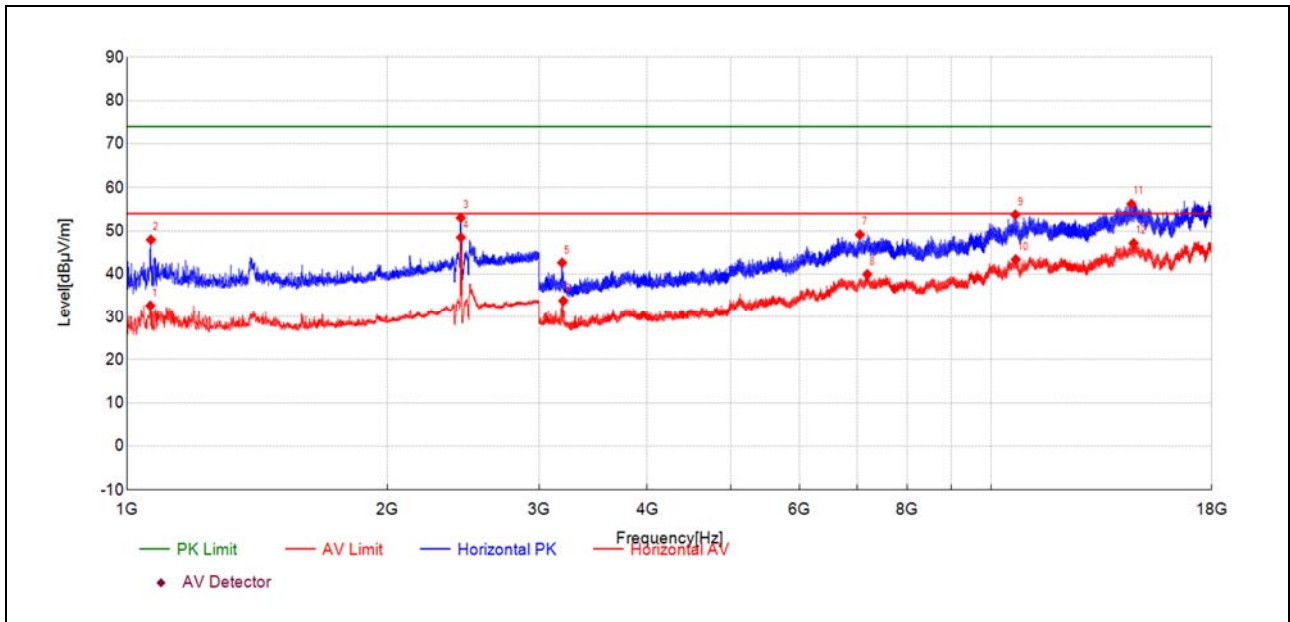
Plot for Channel 6



(Antenna Horizontal, 30MHz to 1GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 55.90         | 62.2              | 34.15             | -28.020          | 40.00             | 5.85           | 150            | 3            | PK       | PASS    |
| 104.79        | 66.9              | 37.62             | -29.270          | 43.50             | 5.88           | 150            | 309          | PK       | PASS    |
| 163.96        | 66.7              | 35.63             | -31.040          | 43.50             | 7.87           | 150            | 189          | PK       | PASS    |
| 264.56        | 61.9              | 34.43             | -27.480          | 46.00             | 11.57          | 150            | 168          | PK       | PASS    |
| 331.78        | 58.9              | 34.50             | -24.390          | 46.00             | 11.50          | 150            | 175          | PK       | PASS    |
| 651.27        | 46.2              | 29.46             | -16.720          | 46.00             | 16.54          | 150            | 296          | PK       | PASS    |

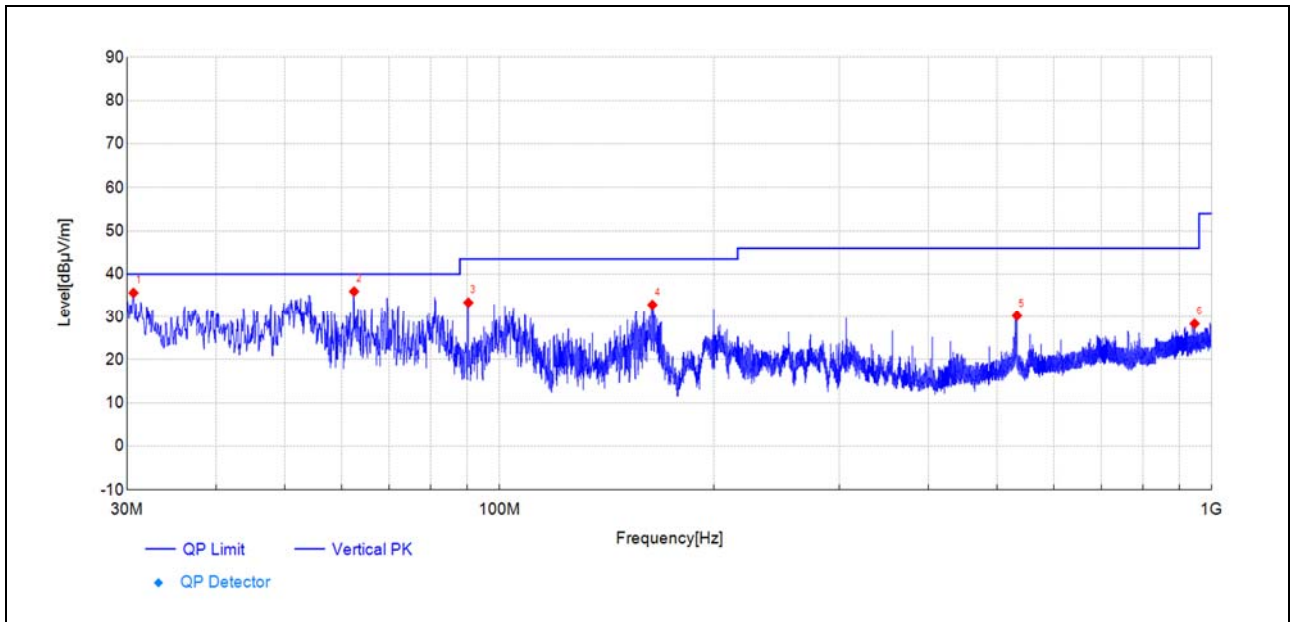




(Antenna Horizontal, 1GHz to 18GHz)

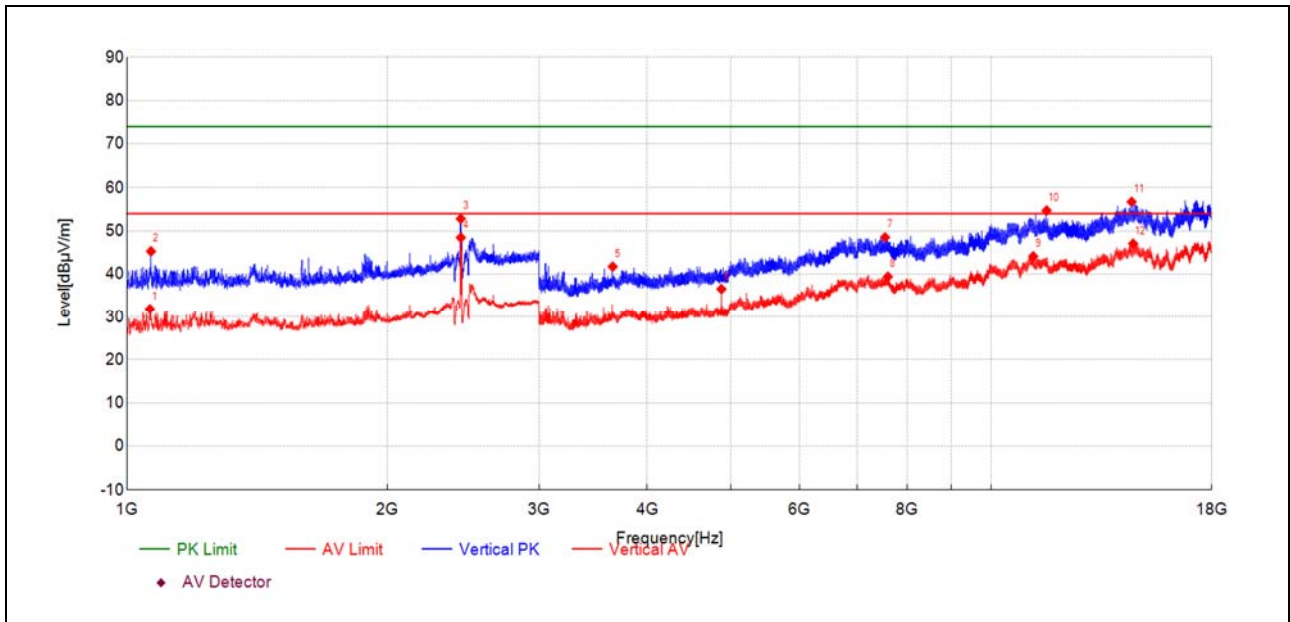
| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 1064.01       | 35.3              | 32.65             | -2.620           | 54.00             | 21.35          | 150            | 54           | AV       | PASS    |
| 1065.61       | 50.6              | 47.94             | -2.620           | 74.00             | 26.06          | 150            | 54           | PK       | PASS    |
| 2433.49       | 47.3              | 53.03             | 5.720            | -                 | -              | 150            | 328          | PK       | NA      |
| 2434.29       | 42.7              | 48.48             | 5.740            | -                 | -              | 150            | 322          | AV       | NA      |
| 3187.72       | 53.4              | 42.63             | -10.740          | 74.00             | 31.37          | 150            | 324          | PK       | PASS    |
| 3198.01       | 44.6              | 33.80             | -10.830          | 54.00             | 20.20          | 150            | 324          | AV       | PASS    |
| 7048.83       | 44.8              | 49.14             | 4.340            | 74.00             | 24.86          | 150            | 283          | PK       | PASS    |
| 7188.98       | 35.0              | 39.97             | 5.000            | 54.00             | 14.03          | 150            | 190          | AV       | PASS    |
| 10666.93      | 41.4              | 53.74             | 12.340           | 74.00             | 20.26          | 150            | 110          | PK       | PASS    |
| 10678.08      | 31.0              | 43.39             | 12.380           | 54.00             | 10.61          | 150            | 0            | AV       | PASS    |
| 14535.33      | 36.2              | 56.23             | 19.990           | 74.00             | 17.77          | 150            | 69           | PK       | PASS    |
| 14618.90      | 26.8              | 47.14             | 20.380           | 54.00             | 6.86           | 150            | 296          | AV       | PASS    |





(Antenna Vertical, 30MHz to 1GHz)

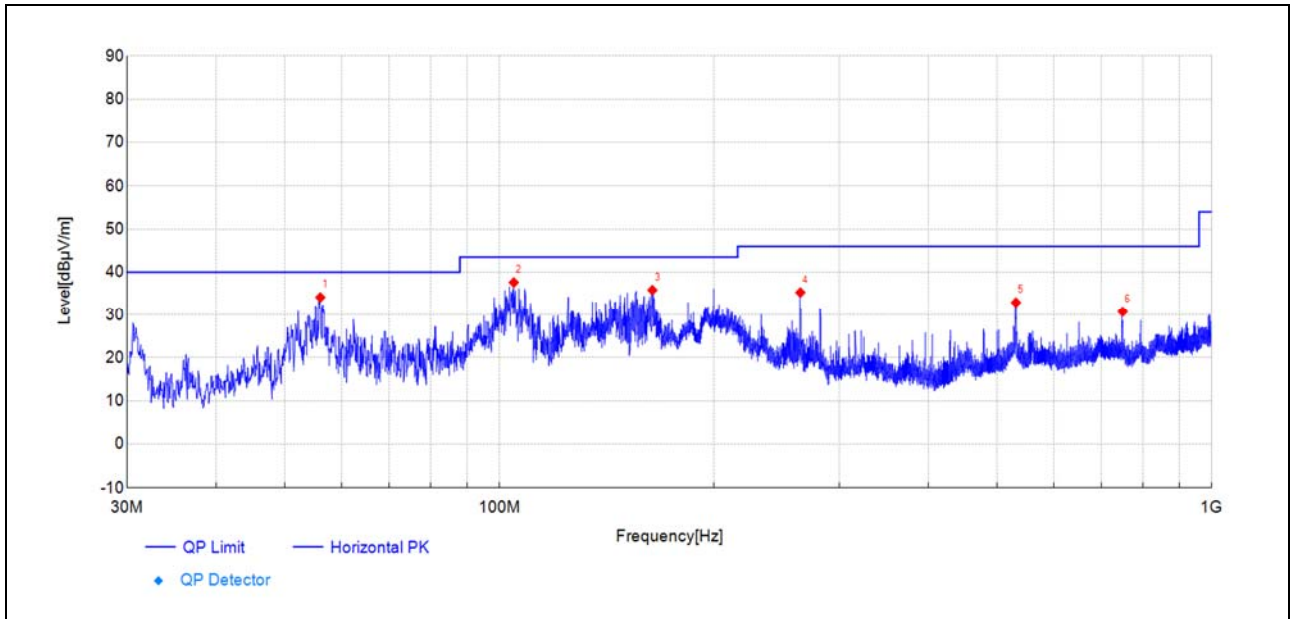
| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 30.63         | 66.4              | 35.65             | -30.750          | 40.00             | 4.35           | 150            | 265          | PK       | PASS    |
| 62.50         | 64.7              | 35.96             | -28.780          | 40.00             | 4.04           | 150            | 133          | PK       | PASS    |
| 90.43         | 64.9              | 33.38             | -31.480          | 43.50             | 10.12          | 150            | 182          | PK       | PASS    |
| 163.96        | 63.9              | 32.86             | -31.040          | 43.50             | 10.64          | 150            | 54           | PK       | PASS    |
| 532.82        | 49.2              | 30.20             | -19.010          | 46.00             | 15.80          | 150            | 351          | PK       | PASS    |
| 946.16        | 39.4              | 28.34             | -11.070          | 46.00             | 17.66          | 150            | 245          | PK       | PASS    |



(Antenna Vertical, 1GHz to 18GHz)

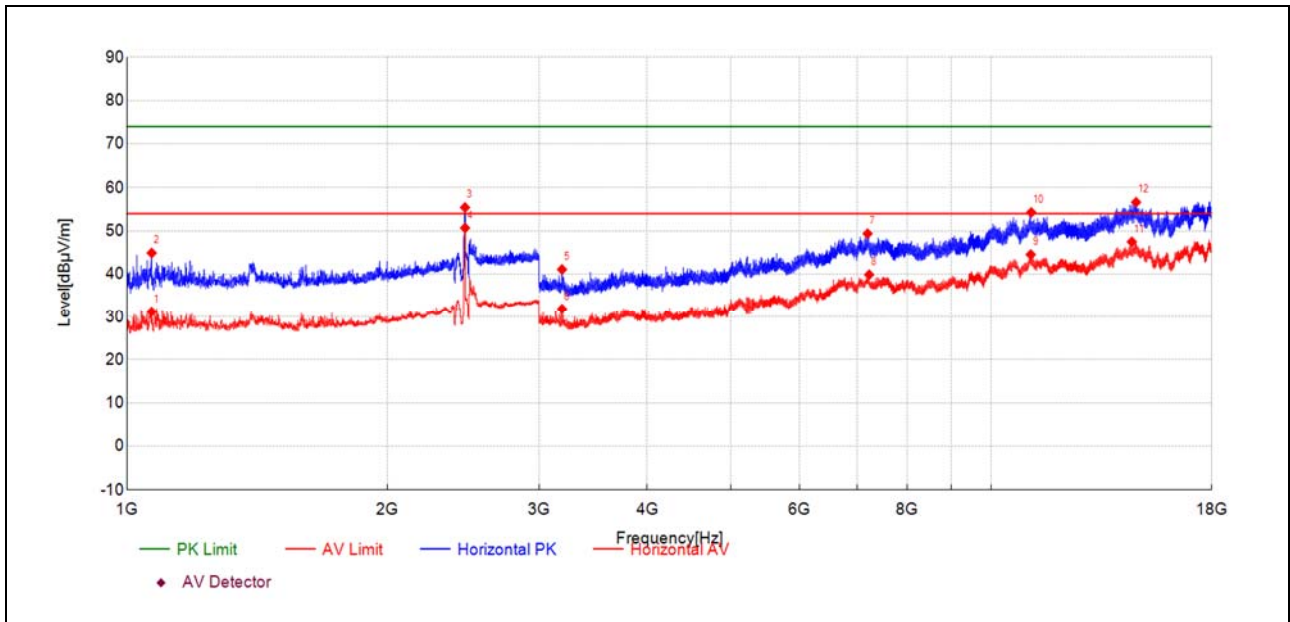
| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 1062.81       | 34.5              | 31.83             | -2.640           | 54.00             | 22.17          | 150            | 64           | AV       | PASS    |
| 1066.01       | 47.9              | 45.27             | -2.620           | 74.00             | 28.73          | 150            | 69           | PK       | PASS    |
| 2433.49       | 47.1              | 52.80             | 5.720            | -                 | -              | 150            | 174          | PK       | NA      |
| 2434.29       | 42.7              | 48.45             | 5.740            | -                 | -              | 150            | 174          | AV       | NA      |
| 3648.45       | 50.5              | 41.74             | -8.800           | 74.00             | 32.26          | 150            | 124          | PK       | PASS    |
| 4874.62       | 41.5              | 36.52             | -4.970           | 54.00             | 17.48          | 150            | 70           | AV       | PASS    |
| 7537.42       | 44.0              | 48.52             | 4.560            | 74.00             | 25.48          | 150            | 31           | PK       | PASS    |
| 7594.42       | 34.5              | 39.40             | 4.900            | 54.00             | 14.60          | 150            | 138          | AV       | PASS    |
| 11186.38      | 30.6              | 44.11             | 13.560           | 54.00             | 9.89           | 150            | 96           | AV       | PASS    |
| 11593.96      | 40.2              | 54.70             | 14.480           | 74.00             | 19.30          | 150            | 83           | PK       | PASS    |
| 14541.76      | 36.7              | 56.73             | 20.030           | 74.00             | 17.27          | 150            | 259          | PK       | PASS    |
| 14600.05      | 26.7              | 47.05             | 20.340           | 54.00             | 6.95           | 150            | 4            | AV       | PASS    |

Plot for Channel 11



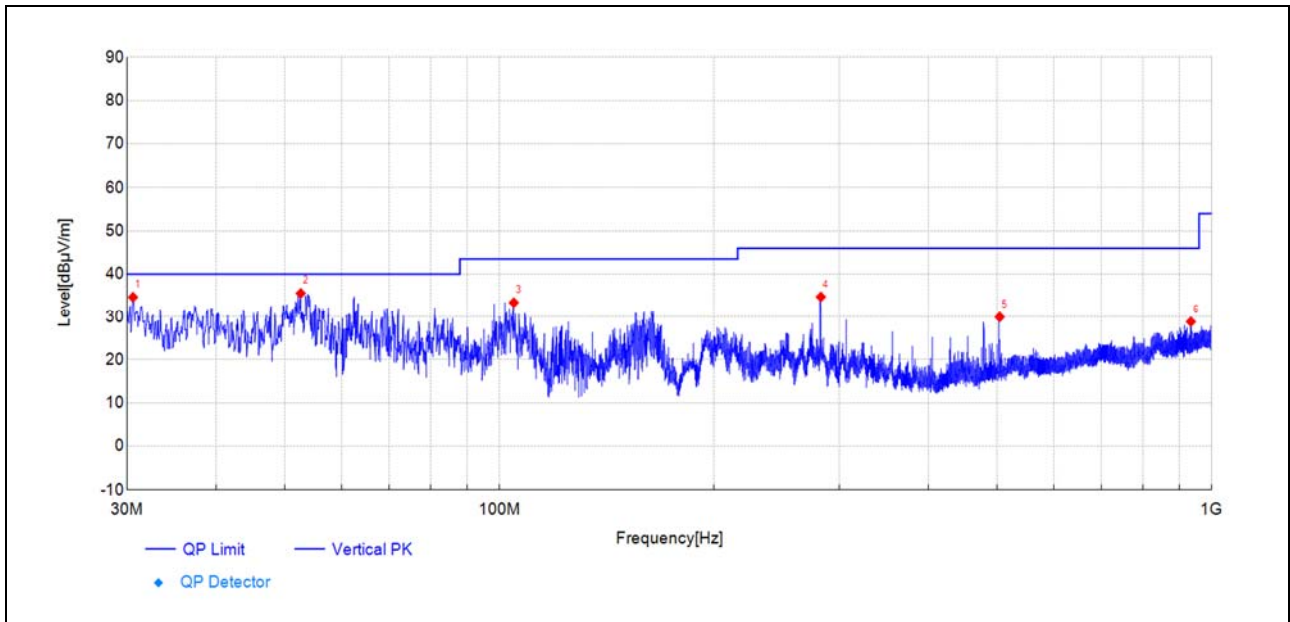
(Antenna Horizontal, 30MHz to 1GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 56.05         | 62.2              | 34.12             | -28.050          | 40.00             | 5.88           | 150            | 359          | PK       | PASS    |
| 104.74        | 66.9              | 37.60             | -29.300          | 43.50             | 5.90           | 150            | 296          | PK       | PASS    |
| 163.96        | 66.9              | 35.82             | -31.040          | 43.50             | 7.68           | 150            | 178          | PK       | PASS    |
| 264.51        | 62.8              | 35.26             | -27.490          | 46.00             | 10.74          | 150            | 9            | PK       | PASS    |
| 531.08        | 51.8              | 32.90             | -18.930          | 46.00             | 13.10          | 150            | 157          | PK       | PASS    |
| 749.92        | 45.6              | 30.72             | -14.840          | 46.00             | 15.28          | 150            | 157          | PK       | PASS    |



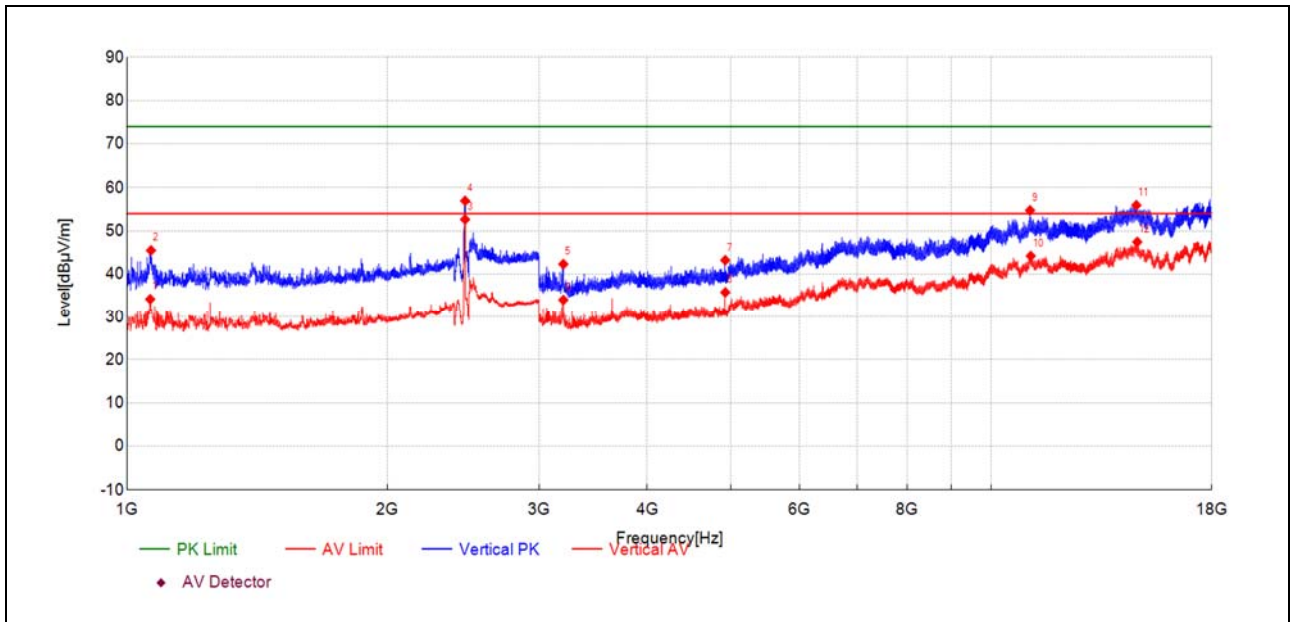
(Antenna Horizontal, 1GHz to 18GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 1067.61       | 33.8              | 31.19             | -2.600           | 54.00             | 22.81          | 150            | 69           | AV       | PASS    |
| 1068.01       | 47.5              | 44.90             | -2.600           | 74.00             | 29.10          | 150            | 69           | PK       | PASS    |
| 2461.09       | 49.5              | 55.43             | 5.950            | -                 | -              | 150            | 326          | PK       | NA      |
| 2461.49       | 44.8              | 50.69             | 5.940            | -                 | -              | 150            | 326          | AV       | NA      |
| 3187.29       | 51.8              | 41.08             | -10.730          | 74.00             | 32.92          | 150            | 43           | PK       | PASS    |
| 3187.72       | 42.6              | 31.85             | -10.740          | 54.00             | 22.15          | 150            | 43           | AV       | PASS    |
| 7195.41       | 44.3              | 49.37             | 5.070            | 74.00             | 24.63          | 150            | 271          | PK       | PASS    |
| 7225.84       | 35.2              | 39.88             | 4.730            | 54.00             | 14.12          | 150            | 110          | AV       | PASS    |
| 11112.23      | 30.5              | 44.53             | 14.010           | 54.00             | 9.47           | 150            | 30           | AV       | PASS    |
| 11128.09      | 40.4              | 54.29             | 13.910           | 74.00             | 19.71          | 150            | 83           | PK       | PASS    |
| 14549.47      | 27.4              | 47.48             | 20.070           | 54.00             | 6.52           | 150            | 16           | AV       | PASS    |
| 14713.62      | 36.2              | 56.64             | 20.480           | 74.00             | 17.36          | 150            | 43           | PK       | PASS    |



(Antenna Vertical, 30MHz to 1GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 30.58         | 65.4              | 34.64             | -30.750          | 40.00             | 5.36           | 150            | 340          | PK       | PASS    |
| 52.60         | 63.4              | 35.54             | -27.850          | 40.00             | 4.46           | 150            | 261          | PK       | PASS    |
| 104.74        | 62.7              | 33.38             | -29.300          | 43.50             | 10.12          | 150            | 129          | PK       | PASS    |
| 282.65        | 61.0              | 34.71             | -26.310          | 46.00             | 11.29          | 150            | 275          | PK       | PASS    |
| 503.82        | 50.4              | 29.92             | -20.470          | 46.00             | 16.08          | 150            | 157          | PK       | PASS    |
| 934.91        | 40.6              | 28.82             | -11.760          | 46.00             | 17.18          | 150            | 129          | PK       | PASS    |



(Antenna Vertical, 1GHz to 18GHz)

| Fre.<br>(MHz) | Reading<br>[dBμV] | Level<br>[dBμV/m] | Factor<br>[dB/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Detector | Verdict |
|---------------|-------------------|-------------------|------------------|-------------------|----------------|----------------|--------------|----------|---------|
| 1063.61       | 36.8              | 34.17             | -2.640           | 54.00             | 19.83          | 150            | 76           | AV       | PASS    |
| 1066.01       | 48.1              | 45.49             | -2.620           | 74.00             | 28.51          | 150            | 81           | PK       | PASS    |
| 2461.49       | 46.7              | 52.66             | 5.940            | -                 | -              | 150            | 152          | AV       | NA      |
| 2461.89       | 51.0              | 56.96             | 5.940            | -                 | -              | 150            | 152          | PK       | NA      |
| 3198.43       | 53.1              | 42.31             | -10.830          | 74.00             | 31.69          | 150            | 21           | PK       | PASS    |
| 3198.86       | 44.9              | 34.01             | -10.840          | 54.00             | 19.99          | 150            | 35           | AV       | PASS    |
| 4923.91       | 48.2              | 43.22             | -4.980           | 74.00             | 30.78          | 150            | 126          | PK       | PASS    |
| 4924.34       | 40.8              | 35.77             | -4.980           | 54.00             | 18.23          | 150            | 126          | AV       | PASS    |
| 11092.95      | 40.8              | 54.75             | 13.990           | 74.00             | 19.25          | 150            | 60           | PK       | PASS    |
| 11114.80      | 30.2              | 44.20             | 14.000           | 54.00             | 9.80           | 150            | 351          | AV       | PASS    |
| 14725.62      | 35.6              | 55.94             | 20.380           | 74.00             | 18.06          | 150            | 139          | PK       | PASS    |
| 14760.76      | 27.4              | 47.45             | 20.070           | 54.00             | 6.55           | 150            | 35           | AV       | PASS    |

END OF REPORT